UNIVERSITI SAINS MALAYSIA

UNIVERSITY RESEARCH GRANT
FINAL REPORT
Geran Penyelidikan Universiti
Laporan Akhir

A.	**PARTICULARS OF RESEARCH** / *MAKLUMAT PENYELIDIKAN:*
(i)	**Title of Research:** *Tajuk Penyelidikan:* **BECHMARKING PROJECT MANAGEMENT BEST PRACTICES IN SUSTAINABLE HOUSING IN MALAYSIA**
(ii)	**Account Number:** *Nombor Akaun:* **1001/PPBGN/814031**
B.	**PERSONAL PARTICULARS OF RESEARCHER** / *MAKLUMAT PENYELIDIK:*
(i)	**Name of Research Leader:** *Nama Ketua Penyelidik:* **Assoc. Prof. Dr. Abu Hassan Abu Bakar**
	Name of Co-Researcher *Nama Penyelidik Bersama:* • Prof. Dato' Dr. Omar Osman • Prof. Madya Abdul Aziz Hussin, *AMN* • Dr. Ilias Said • Dr Shardy Abdullah • En. Arman Abd Razak
(ii)	**School/Institute/Centre/Unit :** *Pusat Pengajian /Institut/Pusat/Unit :* **Housing, Building and Planning**

C.	**Research Platform (Please tick (/) the appropriate box):** *Pelantar Penyelidikan (Sila tanda (/) kotak berkenaan):* ☐ **A. Life Sciences** *Sains Hayat* ☒ **B. Fundamental** *Fundamental* ☐ **C. Engineering & Technology** *Kejuruteraan & Teknologi* ☐ **D. Social Transformation** *Transformasi Sosial* ☐ **E. Information & Communications Technology (ICT)** *Teknologi Maklumat & Komunikasi* ☐ **F. Clinical Sciences** *Sains Klinikal* ☐ **G. Biomedical & Health Sciences** *Bioperubatan Sains Kesihatan*
D.	**Duration of this research :** *Tempoh masa penyelidikan ini :* ***Duration :** 3 Years (Initial) *Tempoh :* • Start Date : 1st June 2008 (approve 1 year) • First Extension : 28/05/2008 – 30/06/2010 • Second Extension : 01/01/2011 – 30/09/2011

E. **ABSTRACT OF RESEARCH**

(An abstract of between 100 and 200 words must be prepared in **Bahasa Malaysia and in English**.
This abstract will be included in the Annual Report of the Research and Innovation Section at a later date as a means of presenting the project findings of the researcher/s to the University and the community at large)

Abstrak Penyelidikan

(Perlu disediakan di antara 100 - 200 perkataan di dalam **Bahasa Malaysia dan juga Bahasa Inggeris**.
Abstrak ini akan dimuatkan dalam Laporan Tahunan Bahagian Penyelidikan & Inovasi sebagai satu cara untuk menyampaikan dapatan projek tuan/puan kepada pihak Universiti & masyarakat luar).

Abstrak:

Perumahan adalah merupakan isu yang kritikal di dalam globalisasi pembandaran dan mempunyai implikasi penting terhadap alam sekitar semasa projek pembinaan dijalankan. Sebagai salah satu elemen terpenting dalam pembangunan bandar, perumahan memainkan peranan yang sangat signifikan dalam mencapai matlamat pembangunan lestari. Keberkesanan pengurusan projek menjadi semakin penting bagi perumahan lestari untuk kekal berdaya saing dalam persekitaran perniagaan yang dinamik kini. Objektif kajian ini adalah untuk mengenal pasti faktor-faktor yang menghalang amalan perumahan lestari dan mencadangkan faktor-faktor kejayaan utama amalan pengurusan projek yang sesuai bagi memenuhi piawaian perumahan lestari di Malaysia. Responden kajian ini adalah terdiri daripada pemaju perumahan yang dipilih secara rawak dari pelbagai negeri di Semenanjung Malaysia. Senarai pemaju perumahan telah diperolehi daripada Persatuan Pemaju Hartanah dan Perumahan Malaysia (REHDA). Soal selidik telah dihantar kepada 500 responden melalui mel. Daripada 500 responden, sejumlah 73 atau 14.6% soal selidik telah dikembalikan, siap dan boleh digunakan untuk tujuan analisis selanjutnya. Data yang diterima telah dianalisis menggunakan kaedah statistik yang sesuai seperti frekuensi dan analisis korelasi. Kajian menunjukkan bahawa kos yang lebih tinggi daripada pilihan perumahan yang lestari, kurangnya inisiatif kesedaran dan kekurangan kepentingan dalam isu-isu alam sekitar dilihat sebagai tiga halangan utama dalam melaksanakan projek perumahan lestari di Malaysia. Kajian ini juga telah mendapati bahawa sokongan pengurusan atasan adalah dianggap sebagai faktor kritikal kejayaan ke atas pengurusan projek dalam melaksanakan perumahan lestari di Malaysia.

Abstract:

Housing is a critical issue in global urbanization which has a tremendous impact on the environment – both during construction and through out their existence. As the key element in urban development, housing plays a vital role in attaining the goal of sustainable development. Effective project management is becoming increasingly important for sustainable housing to remain competitive in today's dynamic business environment. The objectives of this study are to identify factors that impeding the sustainable housing practice and to suggest the key success factor of project management practices that could be appropriate for meeting sustainable housing standard in Malaysia. The respondents of this study are housing developers that randomly selected from various areas in Peninsular Malaysia. The list of the housing developers was obtained from the Malaysian Real Estate and Housing Developers' Association (REHDA). Main questionnaires were delivered to 500 respondents via postal service. Out of 500, 73 or 14.6% questionnaires were returned, completed and usable for further analysis. Returned data was analyzed using relevant statistical methods such as frequencies and correlation analysis. The study indicated that higher cost of sustainable housing option, lack of awareness available initiatives and lack of interest in environmental issues are perceived as the three importance barriers in implementing sustainable housing project in Malaysia. The study also found that top management support is considered as the top critical success factors of project management in implementing sustainable housing in Malaysia.

F. **SUMMARY OF RESEARCH FINDINGS**
Ringkasan dapatan Projek Penyelidikan

- This research has successfully identified factors determining the best practices for project management in sustainable housing.
- The study found that "higher cost of sustainable housing option", "lack of awareness available initiatives" and "lack of interest in environmental issues" are perceived as the three most importance barriers in implementing sustainable housing project.
- The study also found that top management support is the top critical success factors of project management, followed by competent project team, planning project mission/common goal and project understanding respectively.
- The research also provided a basic guideline of good practices for project management in sustainable housing that can contributes to the improvement of project performance.

G. **COMPREHENSIVE TECHNICAL REPORT**

Laporan Teknikal Lengkap

Applicants are required to prepare a comprehensive technical report explaining the project.
(This report must be attached separately)
Sila sediakan laporan teknikal lengkap yang menerangkan keseluruhan projek ini.
[Laporan ini mesti dikepilkan]

Sila Lihat Lampiran.

List the key words that reflectour research:

Senaraikan kata kunci yang mencerminkan penyelidikan anda:

English	Bahasa Malaysia
Sustainable Housing	Perumahan Lestari
Housing Development	Pembangunan Perumahan
Project Management	Pengurusan Projek
Critical Success Factors	Faktor Kritikal Kejayaan

H. **a) Results/Benefits of this research**
Hasil Penyelidikan

No. *Bil:*	Category/Number: *Kategori/ Bilangan:*	Promised	Achieved
1.	**Research Publications (Specify target journals)** *Penerbitan Penyelidikan (Nyatakan sasaran jurnal)*	7	14
2.	**Human Capital Development**		
	a. Ph. D Students	**1**	**1**
	b. Masters Students	**1**	**1**
	c. Undergraduates (Final Year Project)		
	d. Research Officers		
	e. Research Assisstants	**1**	**1**
	f. Other: Please specify		
3.	**Patents** *Paten*		
4.	**Specific / Potential Applications** *Spesifik/Potensi aplikasin*		
5.	**Networking & Linkages** *Jaringan & Jalinan*		
6.	**Possible External Research Grants to be Acquired** *Jangkaan Geran Penyelidikan Luar Diperoleh*		

- Kindly provide copies/evidence for Category 1 to 6.

b) Equipment used for this research.
Peralatan yang telah digunakan dalam penyelidikan ini.

Items ***Perkara***	**Approved Equipment**	**Approved Requested Equipment**	**Location**
Specialized Equipment Peralatan khusus	1.Desktop Computer and Printer 2.HTC Diamond PDA smart phone		HBP, USM
Facility Kemudahan			
Infrastructure Infrastruktur			

- Please attach appendix if necessary.

I.	**BUDGET** / *BAJET*

Total Approved Budget : RM 133, 500.00
Total Additional Budget : RM 28,000.00
Grand Total of Approved Budget : RM 161, 500.00

Yearly Budget Distributed

Year 1 : RM
Year 2 : RM
Year 3 : RM

Additional Budget Approved

Year 1 : RM
Year 2 : RM
Year 3 : RM

Total Expenditure : RM 160 657.69
Balance : RM 842.31

- **Please attach final account statement from Treasury**

Signature of Researcher
Tandatangan Penyelidik

Professor Dr. Abu Hassan Abu Bakar
Deputy Dean
(Graduate & Research)
School of Housing, Building and Planning
Universiti Sains Malaysia

21/3/2012
Date
Tarikh

H.	**COMMENTS OF PTJ'S RESEARCH COMMITTEE** *KOMEN JAWATANKUASA PENYELIDIKAN PERINGKAT PTJ*

General Comments:
Ulasan Umum:

Jawatankuasa telah meneliti dan memperakui laporan akhir ini

Professor Dr. Abu Hassan Abu Bakar
Deputy Dean
(Graduate & Research)
School of Housing, Building and Planning
Universiti Sains Malaysia

Signature and Stamp of Chairperson of PTJ's Evaluation Committee
Tandatangan dan Cop Pengerusi Jawatankuasa Penilaian PTJ

Date : 23/3/2012
Tarikh :

Signature and Stamp of Dean/ Director of PTJ
Tandatangan dan Cop Dekan/ Pengarah PTJ

Profesor Ir. Dr. Mahyuddin Ramli
Dekan
P. P. Perumahan, Bangunan & Perancangan
Universiti Sains Malaysia
11800 Pulau Pinang

Date : 23/3/12
Tarikh :

BENCHMARKING PROJECT MANAGEMENT BEST PRACTICES IN SUSTAINABLE HOUSING IN MALAYSIA

RU Technical Report

Project Leader

Profesor Dr. Abu Hassan Abu Bakar

Co-Researchers

Prof. Dato' Dr. Omar Osman

Associate Prof. Abdul Aziz Hussin, *AMN*

Dr. Ilias Said

Dr. Shardy Abdullah

En. Arman Abd Razak

School of Housing Building and Plannning

Universiti Sains Malaysia

2012

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1. INTRODUCTION

Housing, as human basic need, is a very important issue of people's everyday life. In 1948, the United Nations, in its Universal Declaration of Human Rights, stated that *"everyone has the right to a standard of living adequate for the health and well-being of himself and of his family including food, clothing, housing and medical care and necessary social services..."* According to Winston (Zinkernagel.R, 2001) housing is an essential aspect of life quality and it is also significant for sustainable development. As the key element in urban development, housing plays a vital role in attaining the goal of sustainable development. In order to be sustainable, housing initiatives must be economically viable, socially acceptable, technically feasible and environmentally compatible (Choguill, 2007). Housing encompasses the immediate environment, sanitation, drainage, recreational facilities, and all other economic and social activities that make life worthwhile (Olejado, 2003).

The World Commission on Environment and Development (WCED, 1987), report, Our Common Future has led to a world-wide notion of the concept of sustainable development (Meldon, 1998). Today there are over 300 published definitions of sustainable development, the products of diverse world views and competing vested interests (Moles and Kelly, 2000).

Our Common Future explores how sustainable development *"is not a fixed state of harmony but rather a process of change in which the exploitation of resources, the orientation of technological development, and institutional change are made consistent with future as well as present needs"* (Moles and Kelly, 2000). In other words, (WCED, 1987) it's defined as "*development which meets the needs of the present without comprising the ability of future generations to meet their own needs*". The Commission not only observed that environmental problems need to be addressed, but also socials problem, such as inequity, property, non-prosperity and the violation of human rights, that are related to explosive population growth and the enormous expansion of environmental harms caused by human activities. According to the Commission, solving these problems requires global economic growth whilst respecting ecological constraints (Klunder, 2004). Other studies, (Ding, 2008) defined sustainable development is as a concern of attitudes and judgment to help insure long-term ecological, social and economic growth in society.

Fundamentally, sustainable development addresses three major areas;

I. People living today are entitled to justice and equal rights;

II. Environmental degeneration must be alleviated or eliminated; and

III. Future generations must not be impoverished as a result of current actions (Redclift, 1987).

The detail of what comprises sustainable development is very context –specific and the same condition and practice cannot apply everywhere. Therefore, sustainability has its diverse implications in every corner of the world and in every sector of a society (Bell and Morse, 2003). "Sustainable Housing" is a new concept in developing countries and unearthing projects covering all aspects of sustainability proved to be difficult (Ebsen, 2000).

For construction project, it processes would bring environmental responsibility, social awareness, and economic profitability objectives to the fore in built environment related projects (Langston and Ding, 2001).

Malaysia is a developing country heading towards industrialization. Malaysian urban population expected to grow by between 40% to 50% by 2030 from 70% to 80% of total population. The growths of industries bid rapid housing expansion due to the high demand from the customer. A good housing area has to fulfill the health aspect from the building, drainage, clean water supply, domestic waste management and suitable ventilation. The quality of housing and it's social, economic and environmental performance is critically important for sustainable development. However, the lacks of project management success factors practices in housing development activities may often bring about water, air and land pollutions thus affecting the natural environment, health and quality of life.

These issues are often raised today as problems of uncontrolled development of housing growth, as the concern for environment is not considered. With this concern in mind, housing has become priority in today's development programs which aimed at improving the quality of life and contributing towards the formation of a caring society. However in Malaysia, the issues of sustainable housing are still new and not that familiar. With referring back the house being built in the past decade, that house does not meet the essential criteria of sustainability and unfortunately, there are little to none; in depth studies on this matter. According to Maylor (1999) those organizations that are most resourceful in seeking out the best practices and making those aspects work for them will be the most successful. Hence, success factors of project management were established to develop a new area for further studies to ensure its potential for future sustainable housing.

Research Objectives

1. To identify the factors determine the best practice for project management in sustainable housing.
2. To assimilate the Project management best/good practices in sustainable housing.

2. LITERATURE REVIEW

2.1. Critical success factors for project management practices

Nowadays, companies are increasingly using projects in their daily work to achieve company goals. The only way organizations can be driven to achieve excellence is by keeping an eye on competition and world best practice in all aspects of the business (Bendell et. all, 1998). Recently more and more organizations are recognizing that translating corporate strategies into actions requires project management. The Chartered Institute of Building (1996) has defined project management as the overall planning, co-ordination and control of a project from inception to completion aimed at meeting client's requirements in order to produce a functional and financially viable project that will be completed on time within authorized cost and to the required quality standard. The Project Management Institute (PMI) described project management as "the application of knowledge, skills, tools, and techniques to project activities to meet project requirements" and characterized "high quality projects deliver the required product, service, or result, within scope, on time, and within budget" (PMI, 2004).

Similarly, Kerzner (2001) characterized project management success as the completion of an activity within the allocated time, at or under budget, to specified performance levels and the satisfaction of the client.

According to Mobey and Parker (2002), to increase the chances of a project succeeding it is necessary for the organization to have an understanding of what are the success factors, to systematically and quantitatively assess these factors, anticipating possible causes and effects, and then choose appropriate methods of dealing with them. Once identified, the success of the project management can be achieved.

Generally, the success of a construction project depends on a number of factors, such as project complexity, contractual arrangements, and relationships between project participants, the competency of project managers, and the abilities of key project members (Chua et al., 1999). Bayliss, (2002) in his report said that successful project delivery requires the concerted effort of the project team to carry out the various project activities, but it is the project manager who, at the center of the project network, is responsible for orchestrating the whole construction process.

The search for factors that influence project management success has been growing interest over the past decade. It has been argued that project management success can influence project success, but would be unlikely to prevent project failure (Baccarini 1999, Lim et al 1999, Munns and Bjeirmi 1996, Pinto and Mantel 1990, Wit 1988). Project management is essentially intended to accomplish three objectives: completing the project within budget, on time and meeting specifications. On the other hand, project success deals with the effect of final deliverables (Baccarini 1999, Cooke D. 2002). As in their findings, Pinto and Slevin (1989) concluded that 10 factors were critical to the success of R & D projects. There is, however, little advice on how such key success factors can be used to help alleviate the many problems that occur with project management in practice.

As referred to the ten critical success factors developed by Pinto and Slevin (1989), Pinto and Mantel (1990) suggest that "these critical success factors were found to be generalisable to a wide variety of project types and organizations". Their model is one of the most widely quoted lists of critical success factors (Muller and Turner, 2007). However a single set of project success factors may not be suitable for all industries (Lim et al, 1999; Hartman et al, 1996). Liu and Walker 1998 suggest that as industries operate differently, "a set of critical success factors may not be transferable from one project to another project...only generic areas can be identified and used as broad guidelines."

A comprehensive review of the literature on success factors of project management was conducted. Table 1 gives a list of the critical success factors developed by various literatures. As a summary from that table, it can be said that project management success can be measured on the basis of different variables/factors. Several researchers have identified the factors that significantly determine project management success. Based on the frequency analysis, the critical success factors are prioritized as shown in Table 2.

Table 1: Summary of literature reviews from various author's for project management success

Success Factors for Project Management	Authors						
	Pinto & Slevin (1989)	Chua et al (1999)	PMI (2004)	Turner & Muller (2007)	Walker et al (2004)	Hyvari (2006)	Khang & Moe (2008)
Project Understanding					√		√
Top Management Support	√		√	√		√	√
Information/Communication	√	√	√		√	√	
Client Involvement	√	√	√		√	√	√
Competent Project Team		√		√	√		√
Authority of the Project Manager/Leader		√		√	√	√	√
Realistic Cost and Time Estimates	√		√		√	√	√
Adequate Project Control			√	√			√
Problem Solving Abilities	√				√	√	
Risk Management	√		√				
Adequate Resources							√
Planning	√		√	√	√		√
Monitor performance and feedback		√		√	√	√	
Project mission /common goal	√		√		√	√	

Remark: "√" critical success factors that is determined by the authors either on a conceptual or empirical basis.

Table 2: Prioritization of CSFs

Critical Success Factors	Frequency of Occurrence	Prioritized Rank
Client Involvement	6	1
Authority of the Project Manager/Leader	5	2
Top Management Support	5	2
Realistic Cost and Time Estimates	5	2
Information/Communication	5	2
Planning	5	2
Competent Project Team	4	3
Project mission /common goal	4	3
Monitor performance and feedback	4	3
Adequate Project Control	3	4
Problem Solving Abilities	3	4
Project Understanding	2	5
Risk Management	2	5
Adequate Resources	1	6

The table analysis revealed that majority of authors agreed that client involvement, authority of the project manager/leader, top management support, realistic cost and time

estimates, information/communication and planning become the most important factors to the project management success. For the competence

The table analysis revealed that majority of authors agreed that client involvement, authority of the project manager/leader, top management support, realistic cost and time estimates, information/communication and planning become the most important to the project management success. For the competence project team, project mission, and monitor performance and feedback factors have their presence in third frameworks respectively.

The other critical success factors (adequate project control, problem solving, project understanding and risk management) are presented in very few frameworks (Table 1 and 2). Meanwhile, the factors were not commonly found in the literature which is adequate resources. Based on the analysis survey on project management factors, thirteen factors that listed by researchers have been selected. These factors were used for the purpose of establishing critical factors for project success.

2.2. Sustainable housing criteria

In recent years, a growing number of sustainable building project have became conscious and sustainable building is increasingly becoming part of worldwide building practice (Klunder, 2004). The implementation of sustainable building characteristic has been a beneficial act for the sustainable development. Winston (2007) has explore some important characteristics of sustainable housing include: sustainable land-use planning; resisting scattered settlements; housing close to employment and public transport; higher residential densities; sustainable construction; high standards of energy efficiency in use in dwellings; housing availability, affordability and quality; access to green space, and a high quality residential environment.

According to Bennett and James (1999), the effective sustainability measurement should consider the complete triple bottom line of economic, environmental, and societal performance which is:

a) Social Sustainability - healthy internal environment, safety (personal, household and environmental), provision of social amenity, provision of recreation amenity and accessibility to jobs and amenities

b) Economic Sustainability - cost efficient over time, adaptability with minimum cost, affordability, job creations and local economy

c) Environmental Sustainability - energy efficiency, water efficiency/conservation, reduction of greenhouse gas emissions, waste management / recycling, material efficiency, pollution prevention– noise, water, air, optimization & conservation of land, protect and enhance biodiversity, reduction of car dependency.

This in line with European Union defining sustainable housing in the following perspective: construction (e.g. quality of construction), social and economic factors (e.g. affordability and psychological impacts) and eco-efficiency (e.g. efficient use of non-renewable resources). The focus on sustainable housing implies a perspective of flows (Klunder, 2004). From this

viewpoint, a sustainable housing is characterized by the minimization of the environmental impacts of material use, energy consumption and water consumption during the whole service life of the building.

As refer to Sinou and Kyvelou (2006), the dimension tools for sustainability that have been developed worldwide are built upon various principles and different evaluation items, data and criteria. However, they discovered that the vast majority of these tools do not take into clarification the lifetime parameters. Meaning that, the assessment is based on original conditions and characteristic, whereas the alterations of the building elements' attributes are not taken into consideration (Sinou and Kyvelou, 2006).

A review of the most frequently used tools and a comparison of general criteria measuring sustainable development has been carried out. Several methods give different variables to measure sustainable development depending on its nature, location and environment and thus climate.

The methods are GB Tool (Green Building Tool), LEED (Leadership in Energy and Environment Design), CASBEE (Comprehensive Assessment System for Building Environmental Efficiency), BREEAM (Building Research Establishment Environmental Assessment Method), HQE (High Environmental Quality), VERDE, EEWH (Green Building Evaluation System), Green Star, Green Mark, HK_BEAM and recently launched in Malaysia, the Green Building Index (GBI). A detailed analysis of sustainable development variables by different methods is presented in Table 3.

Table 3: Analysis of sustainable development variables by different methods

Variables	Green Mark	HK_BEAM	VERDE	GBI	Frequency of Occurrence	Prioritized Rank
	Singapore	Hong Kong	Spain	M'sia		
Energy Efficiency	X	X	X	X	11	1
Sustainable Site	X	X	X	X	10	2
Materials Resources		X	X	X	10	2
Water Efficiency	X	X	X	X	10	2
Indoor Environment Quality	X	X	X	X	9	3
Management	X			X	5	4
Health & Comfort			X		4	5
Innovation	X	X		X	4	5
Pollution					4	5
Transportation			X		3	6
Build Environment Quality & Performance					3	6
Services/Quality			X		2	7
Economic			X		2	7
Social			X		2	7
Ecology					2	7
Land Use					1	8

Table 3: Continued

Variables	CASBEE	LEED	GB Tool	BREEAM	HQE	EEWH	Green Star
	Japan	USA	Europe	UK	France	Taiwan	Australia
Energy Efficiency	X	X	X	X	X	X	X
Sustainable Site	X	X	X	X	X		X
Materials Resources	X	X	X	X	X	X	X
Water Efficiency	X	X	X	X	X		X
Indoor Environment Quality	X	X	X		X		X
Management				X	X		X
Health & Comfort				X	X	X	
Innovation		X					
Pollution	X		X	X			X
Transportation				X			X
Build Environment Quality & Performance	X		X		X		
Services/Quality	X						
Economic			X				
Social			X				
Ecology				X		X	

Based on the discussion, sixteen variables that listed by different method have been selected. The analysis of the parameters/variables (Table 3) showed that variables such as Sustainable Site, Indoor Environment Quality, Energy Efficiency, Materials Resources and Water Efficiency were involved in almost of the methods. On the contrary, other variables were considered by fewer methods. Services/Quality, Economic, Social and Ecology were evaluated by only two of the eleven methods and the land use only by one. For the purpose in this study, all variables were used to measure sustainable housing development.

3. THEORETICAL FRAMEWORK

Project success is a complex and often illusory construct. The subject of project management is vast and numerous authors continuously add to the body of literature on the subject. Bjeirmi and Munns (1996) suggested in their research that there is an overlap between project management and projects, in that the former is a subset of the latter. Dey (2002) added that current project management practices of organizations in the industry sector do not always ensure success. Successful project management can contribute towards project success but it is unlikely able to prevent project failure (de Wit, 1988).

Furthermore, project success reflects the effective sustainable achievement of the project purpose and long term goals (Khang and Moe, 2008).

This study focused on project management success factors that contribute in sustainable housing development. The various variables affecting the project success are identified in the previous section followed by criteria of sustainable housing. It is expected that study of project management in the extent of project success could lead toward meeting criteria of sustainable housing. This approach in sustainable housing area will provide much needed information to local authorities to take more effective control of housing issues.

Figure 1 provides a theoretical framework that incorporates the critical success factors of project management and the criterion of measuring sustainable housing. To date, it was clearly that most research focused on identifying and analyzing project management success factors and sustainable housing criteria as separate groups. So, this study aims to represent a contribution towards formulizing or integrating the relationship among the two groups of factors. This is a first step for further conceptual and empirical developments in identifying to which extend does project management success factors compliment the sustainable housing. This adopted approach may help in developing the way forward.

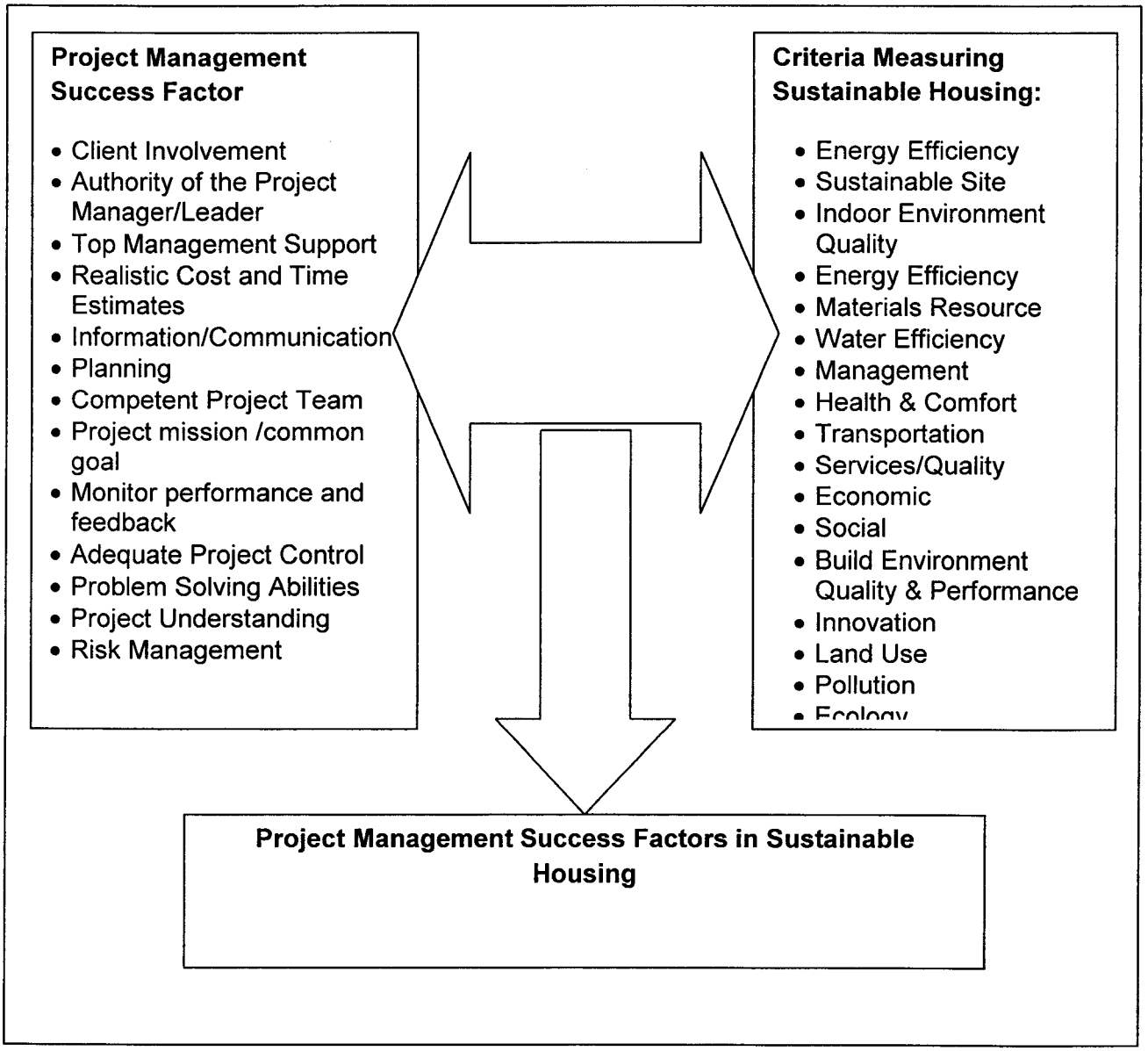

Figure 1: Conceptual Framework of Project Management Success Factors in Sustainable Housing

4.0 RESEARCH METHOD

Survey research was the main method used to accomplish the study objective, where questionnaire was used for the purpose of collecting primary data. The respondents of this study are housing developers that randomly selected from various areas in Peninsular Malaysia namely Pulau Pinang, Kuala Lumpur, and Johor Baharu, where most of housing developments occur. The list of the housing developers was obtained from the Real Estate and Housing Developers' Association (REHDA). Questionnaires were delivered to 500 respondents via postal service. Out of 500, 73 or 14.6% questionnaires were returned, completed and usable for analysis. The data gathered was analyzed using relevant statistical methods such as frequencies and correlation analysis.

5.0 ANALYSIS

Respondent's Profile

A total of 73 construction developers have responded to this survey. The job designation of respondents are mainly as project manager representing 47.9%, followed by managing director (13.7%), engineer (11%), quantity surveyor (12.3%) and architect (8.2%). In terms of education level, most of the respondents have bachelor's degree (71.2%), and master's degree (24.7%). These respondents have been active in the industry between 6 to 10 years and majority of them had been involved with more than 10 projects for the past 10 years. Most of the companies have been involved in housing industry more than 20 years constituted 37%, followed by between 11-20 years (31.5%) and 6-10 years (15.1%). This clearly shows that most of the respondents participated in this study are well experienced in housing projects.

Level of knowledge on sustainable housing concept

Majorities of respondents (49.3%) considered their knowledge on sustainable housing concept at moderate level. There are 34.2% of respondents considered their knowledge were at high level, and only 4.1% considered it at very high level (See Figure 1). From this result, it is deduced that majority of the respondent have high level of knowledge on the concept of sustainable housing.

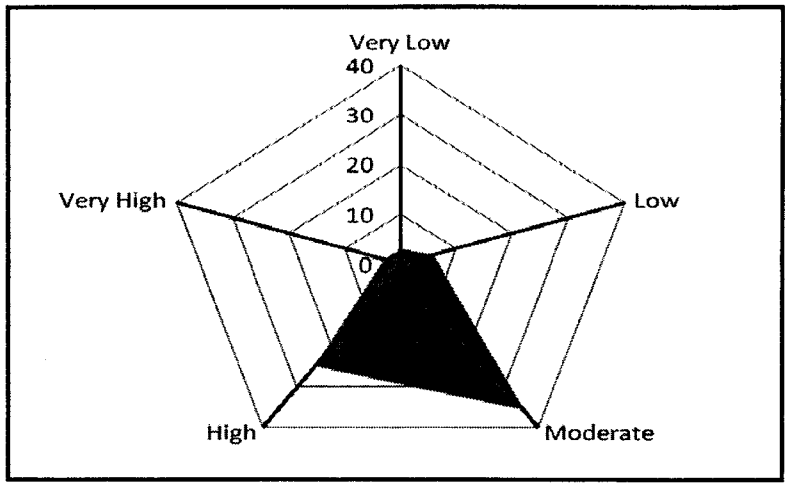

Figure 1. Level of knowledge on sustainable housing concept

Barrier or Constraints in Implementing Sustainable Housing

Table 3 shows the ranking of a barriers or constraints in implementing sustainable housing. The barrier was ranks according to their mean score. If two barriers happened to receive the same mean value, the one with lower standard deviation was regarded as more important. Based on the mean score of the responses, Table 3 shows that respondents identified 'higher cost of sustainable housing option' as the most critical barrier in implementing sustainable housing in Malaysia. Secondly is lack of awareness available initiatives, followed by lack of interest in environmental issues, market demand and so on as shown in Table 3.

Table 3: Barrier or Constraints in Implementing Sustainable Housing

Barrier	Mean	Std. Deviation	Rank
Higher cost of sustainable housing option	4.29	0.79	1
Lack of awareness available initiatives	4.03	0.799	2
Lack of interest in environmental issues	3.97	0.986	3
Market demand	3.97	1.04	4
Limited knowledge of environmental issues	3.93	0.855	5
Society's culture not paying attention to SH	3.84	0.866	6
Lack of fiscal incentive	3.81	1.036	7
Lack of professional capabilities	3.79	0.799	8
Lack of expressed interest from clients	3.79	0.999	9
Lack of training/education in sustainable design	3.78	0.651	10
Lack of technical understanding	3.73	0.712	11
Regulation barriers	3.73	0.976	12
Learning curriculum not keen to environment preservation	3.68	0.848	13
Unavailability of green building product	3.64	0.933	14
Not wanting to alter lifestyle	3.59	1.141	15
Procurement issues	3.55	0.883	16

Critical Success Factors of Project Management Practices in Sustainable Housing

Table 4 shows the ranking of critical success factors (CSFs) of project management in sustainable housing. The CSFs was ranks according to their mean score. Based on the mean score of the responses, it shows that 'top management support' was rated as the most critical success factor sustainable housing in Malaysia. Secondly is competent project team, followed by planning stage, project mission/common goal and so on as shown in Table 4.

Table 4: Critical Success Factors of Project Management in Sustainable Housing

Critical Success Factors	Mean	Std. Deviation	Rank
Top management support	4.77	.426	1
Competent project team	4.66	.606	2
Planning stage	4.64	.586	3
Project mission/ common goal	4.53	.579	4
Project understanding	4.48	.835	5
Realistic cost and time	4.47	.579	6
Problem solving abilities	4.41	.620	7
Authority of project manager	4.33	.602	8
Information / Communication	4.32	.724	9
Monitor performance and feedback	4.27	.750	10
Risk management	4.21	.957	11
Adequate project control	4.19	.828	12
Client Involvement	4.14	1.004	13

Relationship between Critical Success Factors and Sustainability Criteria

The relationship between critical success factors and sustainability criteria was investigated using Spearman Rho correlation analysis. The analysis was used to find out if there was statistically significant relationship between critical success factors and sustainability criteria. The critical success factors consist of 13 factors as listed in the Table 5, while the sustainability criteria are represented by three criteria namely environmental sustainability, economical sustainability and social sustainability. From the Table 5, it shows that only 3 out of 13 critical success factors of project management have a positive effect on all sustainability criteria. These factors are authority of project manager, information/communication and planning stage factor. Although only three factors are correlated with all sustainability criteria, however it also can be seen that some critical success factors have a good relationship with some sustainability criteria, for example, the project mission/common goal and adequate project control are significantly correlated with social sustainability.

Table 5: Correlation between Critical Success Factors of Project Management and Sustainability Criteria

Critical Success Factors	Spearman RHO Correlation		
	Environmental Sustainability	Economical sustainability	Social Sustainability
Client Involvement	-.292*	.053	.016
Authority of project manager	.241*	.480**	.355**
Top management support	.224	.153	.225
Realistic cost and time	.013	-.096	.146
Information / Communication	.272*	.483**	.278*
Planning stage	.398**	.247*	.395**
Competent project team	.041	-.096	.073
Project mission/ common goal	.142	.035	.316**
Monitor performance and feedback	.220	.193	.208
Adequate project control	.161	.130	.332**
Problem solving abilities	-.123	.187	.031
Project understanding	.053	.219	.130
Risk management	.029	.191	.226

Notes: Significant at: *p< 0.05; * *p< 0.01

6. RESEARCH FINDINGS

The study have found that "higher cost of sustainable housing option", "lack of awareness available initiatives" and "lack of interest in environmental issues" are perceived as the three

barriers of most importance, while "unavailability of green building product", "not wanting to alter lifestyle" and "procurement issues" are regarded as the three least importance barriers. In term of critical success factors, it was found that top management support is stated as the top critical success factors of project management, followed by competent project team, planning stage, project mission/common goal and project understanding respectively. Although, top management support was considered as the most critical factors of project management, however in the assessment of correlation analysis between critical success factors and sustainability criteria show that the top management factor has no significant effect on the three pillars of sustainability criteria. It has shown that only three factors are significant with the sustainability criteria namely authority of project manager, information/ communication and planning stage factor. These three factors are the most significant factors that a related to sustainability criteria and should be considered by housing developers when implementing project management in sustainable housing development in Malaysia.

7. CONCLUSION

Explorations of critical success factors of project management in sustainable housing are vital towards the success of housing project to meet sustainability criteria. On other hand implementation of project management in sustainable housing drive the project completing within budget, on time and meeting specifications. In fact, the housing expansion is one of the major contributors to the development of any country. Unfortunately, the issue of sustainable housing development in Malaysia scope is still new and there are no proactive action had been taken to develop the housing sector in sustainable way. This study was conducted to identify barriers in implementing the sustainable housing project and to identify the critical success factors of project management that meet the criteria of sustainable housing in Malaysia. Based on the findings, it can be deducted that the objectives of the study have been successfully achieved. The findings of the study can act as a basic

guideline for key players in Malaysia that implement project management practices in development of sustainable housing project.

Limitation

Initial proposal of this research is targeted to achieve 3 objectives as follows:

1. To identify the factors determine the best practice for project management in sustainable housing;
2. To assimilate the Project management best/good practices in sustainable housing; and
3. To benchmark the best practice of project management practices for sustainable housing.

However, only the first two of the objectives could be successfully achieved due to budget constraint. The research constraint has been presented during the progress monitoring exercises held both in June 2010 and June 2011 and the panels have agreed to the justifications presented.

8.0 PROJECT ACHIEVEMENT

Publications

a) Journal Paper

i) Published Papers

No.	International
1.	Abu Hassan **Abu Bakar**, Khor Soo Cheen and Rahmawaty, (2011). Sustainable Housing Practices in Malaysian Housing Development: Towards Establishing Sustainability Index, *International Journal of Technology (IJTECH),* ISSN 2086-9614, 2(1), 84-93.
2.	Abu Hassan **Abu Bakar**, Arman Abd Razak, Aidah Awang, Vasanthi Perumal, (2010). Critical success factors for sustainable housing: a framework from the project management view, *Asian Journal of Management Research*, ISSN 2229 3795, Vol.1 (1), 66-80.
3.	Abu Hassan **Abu Bakar**, Khor Soo Cheen (2012) Incorporating Sustainable Management System into Housing Development Practice in Malaysia, International Journal of Sustainable Development (In Press)
4	Abu Hassan **Abu Bakar**, Mahyuddin Ramli, Mazlina Jamaludin, and Aulina Adamy, (2011). Awareness Assessment towards the Implementation of Sustainable Housing in Malaysia, *Asian Journal of Management Research*, ISSN 2229-3795, Vol.1 (2), 703 -713.

ii) Papers to be published

1.	Abu Hassan Abu Bakar, Omar Osman, Arman Abdul Razak, Shardy Abdullah, Mohamad Nizam Yusuf and Aidah Awang (2012) Critical Success Factors For Project Management Practices In Sustainable Housing, International Journal of Sustainable Development, *ISI* (under review)
2.	Abu Hassan Abu Bakar, Omar Osman, Abdul Aziz Hussin, and Mohamad Nizam Yusuf (2012) The relationship between Success Factors of Project Management and Sustainable Housing using Partial Least Squares (PLS) Method, International Journal of Project Management, ISI (manuscript under preparation)

b) Conference Proceedings

1. Abu Hassan Abu Bakar and Khor Soo Chen, (2008). Sustainable Housing Practices in Housing Development in Malaysia Towards Establishing Sustainability Index, In Proceeding in International Conference on Built Environment of Developing Countries, Sustainable Built Environment: Bridging Theory and Practice, (ICBEDC2008), 3-4 December 2008, Universiti Sains Malaysia.
2. Abu Hassan Abu Bakar and Aidah Awang, (2008). Establishing Critical Success Factor for Project Management Best Practices in Sustainable Housing in

Malaysia: Towards Benchmarking, In Proceeding in International Conference on Built Environment of Developing Countries, Sustainable Built Environment: Bridging Theory and Practice, (ICBEDC2008), 3-4 December 2008, Universiti Sains Malaysia.

3. Abu Hassan Abu Bakar and Khor Soo Cheen, (2008). Project Management Best Practices for Sustainable Housing Development, In Proceeding of the International Conference on Coastal Planning, Architecture and Tourism, 28-30 October 2008, Sam Ratulangi University, Manado, Indonesia.
4. Mazlina Jamaludin and Abu Hassan Abu Bakar, (2008). Towards the Implementation of Sustainable Housing In Malaysia: Awareness and Readiness Assessment Framework, In Proceeding in International Conference on Built Environment of Developing Countries, Sustainable Built Environment: Bridging Theory and Practice, (ICBEDC2008), 3-4 December 2008, Universiti Sains Malaysia.
5. Abu Hassan Abu Bakar and Aidah Awang (2009). Critical Factors for Project Management Best Practices in Sustainable Housing: A Framework, 8th MiCRA Conference, 8-9 June 2009, Universiti Sains Malaysia.
6. Abu Hassan Abu Bakar, Arman Abdul Razak, Shardy Abdullah and Aidah Awang, (2009). Project Management Success Factors for Sustainable Housing: A Framework, In Proceeding of the International conference on Construction Industry, 30th July-1st Aug 2009, Bong Hatta University, Padang, Indonesia.
7. Abu Hassan Abu Bakar, Khor Soo Cheen and Rahmawaty, (2009). Sustainable Housing Practices in Malaysian Housing Development: Towards Establishing Sustainability Index, In Proceeding of International Conference on Quality in Research, 3-6 August 2009, Universitas Indonesia, Jakarta.
8. Khor Soo Cheen and Abu Hassan Abu Bakar, (2011). Management of Residential Neighbourhood Development in Malaysia towards Sustainability, in the Proceeding of the 5th International Conference on Built Environment in Developing Countries 2011, (ICBEDC 2011), Vistana Hotel, Pulau Pinang, 6-7 December 2011, ISSN 978-967-394-061-5, pp782-797.

Human Capital Development

Human Capital	Number
PhD Student	1
MSc Student	1
Temporary Research Assistant	1
Total	3

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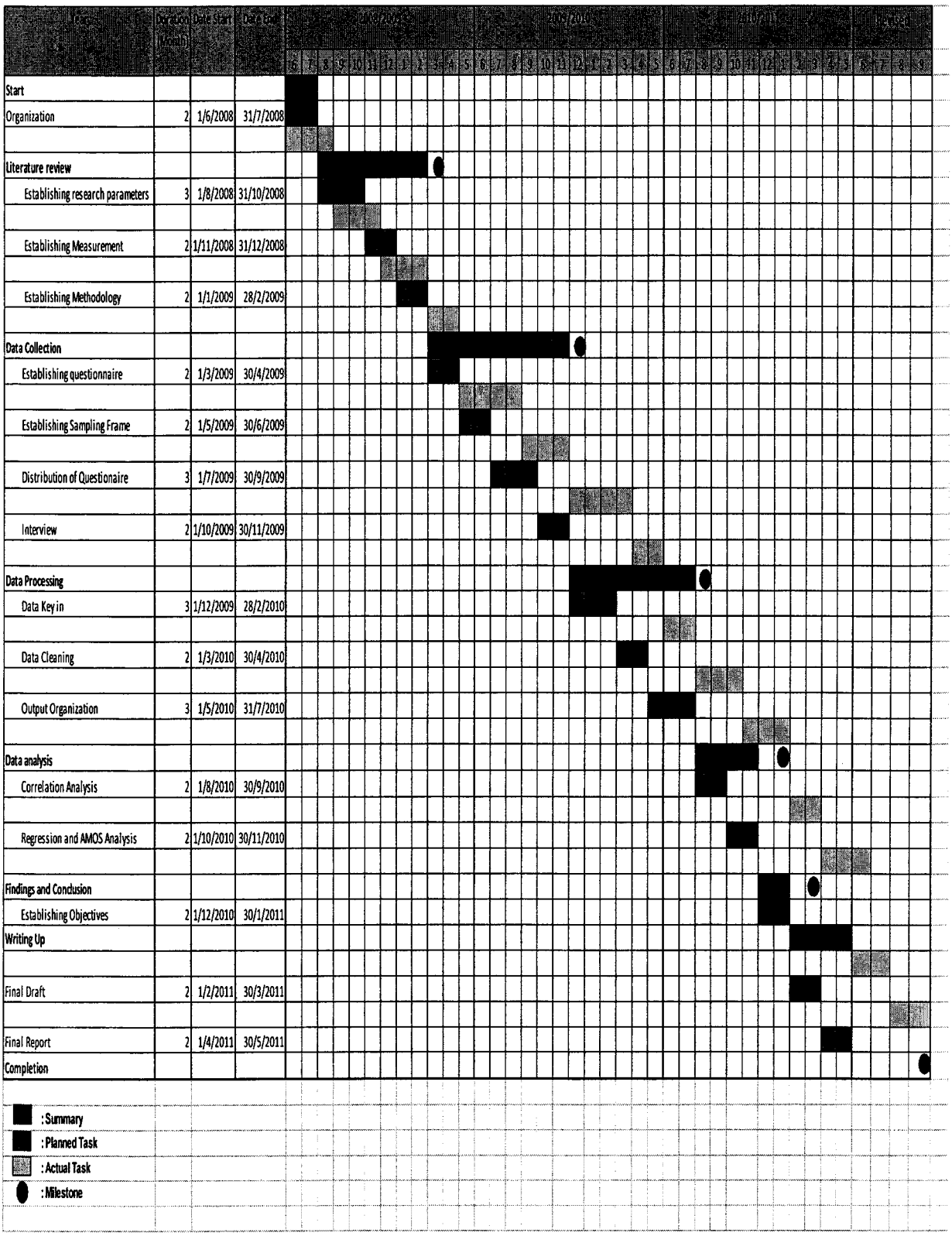
GANTT CHART (PLANNED VERSUS ACTUAL)



Purchase Requisition ▸ Purchase Order ▸ Suppliers ▸ Maintenance ▸ Financials ▸ Coda Info ▸ Reports ▸ Admin ▸

UserCode: SHAHRENA / USMPGLIVE / PPBGN **Program Code: Votebook9100** **Current Program : Votebook (Header)**

Current Date : 22/03/2012 9:44:47 AM **Version: 15.02, Last Updated at 29/12/2011** **DB: 13.02, 9/27/2010 VB: 13.01, 3/14/2011** **Switch Language : English /Malay**

Wildcard : eg. Like 100%, Like 10%1, Like %1

Element 1: 1001 Element 2: % Element 4: PPBGN

Element 5: 814031 Year: 2012

Detail	Excel	Budget Rule	Budget Control	Account Description	Budget Account Code	Roll over	Budget	Cash Received	Advanced	Commit	Actual	Available	Percentage
Detail	Excel	489	T	Projek Kumpulan Wang Uni Penyelidikan	1001.111.0.PPBGN.814031	43,116.63	0.00	0.00	0.00	0.00	0.00	43,116.63	0.00%
Detail	Excel	489	T	Projek Kumpulan Wang Uni Penyelidikan	1001.115.0.PPBGN.814031	-2,340.66	0.00	0.00	0.00	0.00	0.00	-2,340.66	0.00%
		489	T	SubTotal		40,775.97	0.00	0.00	0.00	0.00	0.00	40,775.97	0.00%
Detail	Excel	490	T	Projek Kumpulan Wang Uni Penyelidikan	1001.221.0.PPBGN.814031	-3,974.71	0.00	0.00	0.00	0.00	0.00	-3,974.71	0.00%
Detail	Excel	490	T	Projek Kumpulan Wang Uni Penyelidikan	1001.223.0.PPBGN.814031	843.90	0.00	0.00	0.00	0.00	0.00	843.90	0.00%
Detail	Excel	490	T	Projek Kumpulan Wang Uni Penyelidikan	1001.224.0.PPBGN.814031	500.00	0.00	0.00	0.00	0.00	0.00	500.00	0.00%
Detail	Excel	490	T	Projek Kumpulan Wang Uni Penyelidikan	1001.226.0.PPBGN.814031	1,500.00	0.00	0.00	0.00	0.00	0.00	1,500.00	0.00%
Detail	Excel	490	T	Projek Kumpulan Wang Uni Penyelidikan	1001.227.0.PPBGN.814031	-19,225.20	0.00	0.00	0.00	0.00	0.00	-19,225.20	0.00%
Detail	Excel	490	T	Projek Kumpulan Wang Uni Penyelidikan	1001.228.0.PPBGN.814031	5,000.00	0.00	0.00	0.00	0.00	0.00	5,000.00	0.00%
Detail	Excel	490	T	Projek Kumpulan Wang Uni Penyelidikan	1001.229.0.PPBGN.814031	-9,577.89	0.00	0.00	0.00	0.00	0.00	-9,577.89	0.00%
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Detail	Excel	491	T	Projek Kumpulan Wang Uni Penyelidikan	1001.335.0.PPBGN.814031	-3,399.00	0.00	0.00	0.00	0.00	0.00	-3,399.00	0.00%
		491	T	SubTotal		-3,399.00	0.00	0.00	0.00	0.00	0.00	-3,399.00	0.00%
Detail	Excel	492	T	Projek Kumpulan Wang Uni Penyelidikan	1001.441.0.PPBGN.814031	-11,430.00	0.00	0.00	0.00	0.00	0.00	-11,430.00	0.00%
		492	T	SubTotal		-11,430.00	0.00	0.00	0.00	0.00	0.00	-11,430.00	0.00%
Detail	Excel	493	T	Projek Kumpulan Wang Uni Penyelidikan	1001.552.0.PPBGN.814031	-170.76	0.00	0.00	0.00	0.00	0.00	-170.76	0.00%
		493	T	SubTotal		-170.76	0.00	0.00	0.00	0.00	0.00	-170.76	0.00%
		9999		GrandTotal		842.31	0.00	0.00	0.00	0.00	0.00	842.31	0.00%

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SUSTAINABLE HOUSING PRACTICES IN MALAYSIAN HOUSING DEVELOPMENT: TOWARDS ESTABLISHING SUSTAINABILITY INDEX

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ABSTRACT

This paper presents a study of sustainable rating systems for sustainable housing that have been developed by various countries around the world. The objective of this study is to develop a framework for a rating system for housing development by taking into account local requirements. There are numerous sustainable rating systems for buildings and groups of buildings that have been developed and rating tools like Comprehensive Assessment System for Building Environmental Efficiency (CASBEE), Leadership in Energy and Environmental Design (LEED), British Research Establishment Environmental Assessment Method (BREEAM), Green Building (GB) Tool and Green Star influential in the development of other rating systems. Malaysia has recently launched a rating system for buildings called the Green Building Index (GBI). However, Malaysia has yet to introduce a rating system for measuring sustainable practices in housing development. Hence, this paper reviews some available tools related to the rating of housing developments for the purpose of developing one for Malaysia. Important factors for developing a tool for measuring sustainability practices should include sustainability criteria that relates to the environment, society, economics, site/land use, communication, and transportation. An index for measuring sustainability in housing development will be developed to suit the local context. The formulated index will take into consideration the parameters in sustainable housing developed by various systems around the world. The index, called A Comprehensive Assessment System for Sustainable Housing (CASSH), will be available for further testing.

Keywords: Sustainable housing development; Urban development; Building (housing); Sustainability index; Malaysia

1. INTRODUCTION

Sustainable development is a common and contemporary goal of many urban (re)development policies in various countries (Berke & Conroy, 2002; Chan & Lee, 2006). Development of the housing sector also requires knowledge of urban development policies. Many housing schemes have been developed in Malaysia since housing is a prerequisite for human habitat settlements. In the present context, housing is developing in line with the goals of Habitat Agenda as well as the principles of Agenda 21, a blueprint for sustainable development in the 21st Century adopted by 179 nations (including Malaysia) in Rio de Janeiro in June 1992. Tosics (2004), housing is one of the most important public policies affecting urban development and, as such, it has significant potential to contribute to sustainability.

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Critical success factors for sustainable housing: a framework from the project management view

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ABSTRACT

Housing is the critical issue in global urbanization which have a tremendous impact on the environment – both during construction and through out their. As the key element in urban development, housing plays a vital role in attaining the goal of sustainable development. Effective of project management is becoming increasingly important for sustainable housing to remain competitive in today's dynamic business environment. This paper is attempted to establish a theoretical framework for project management success factors in sustainable housing development. Review on past literature on the subject were carried out to build the existing research works on the area and to establish critical success factors of project management best practices. At the end of this paper, a new area of managing sustainable housing for future direction of this research was identified. A list of critical success factors for project management practices for sustainable housing development was established.

Keywords: Sustainable, Housing, Development, Project Management, Critical Success Factors.

1. Introduction

Housing, as human basic need, is a very important issue of people's everyday life. In 1948, the United Nations, in its Universal Declaration of Human Rights, stated that *"everyone has the right to a standard of living adequate for the health and well-being of himself and of his family including food, clothing, housing and medical care and necessary social services..."* According to Winston (Zinkernagel.R, 2001) housing is an essential aspect of life quality and it is also significant for sustainable development. As the key element in urban development, housing plays a vital role in attaining the goal of sustainable development. In order to be sustainable, housing initiatives must be economically viable, socially acceptable, technically feasible and environmentally compatible, Choguill (Choguill, C. L., 2007). Housing encompasses the immediate environment, sanitation, drainage, recreational facilities, and all other economic and social activities that make life worthwhile, Olejado (Olejado, E.O. 2003).

The World Commission on Environment and Development (WCED), (WCED, 1987), report, Our Common Future has led to a world-wide notion of the concept of sustainable development

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Awareness Assessment Framework for Implementing the Sustainable Housing in Malaysia

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ABSTRACT

The concept of sustainability has become the keystone of the global dialogue about the human future in every facets of human life. Stipulated in Agenda 21, the overall human settlement objective is to improve the social, economic and environmental quality of human settlements and the living and working environments of all people, in particular the urban and rural poor. There is a common understanding that housing and construction sector is one of the most important sectors with regards to a future sustainable development. Nevertheless, evaluation of sustainable housing is far more complicated than that of economic–environmental problems. The fact is that even though the concept of sustainable housing has been introduced two decades ago, it is still a difficult concept for many to fully understand. The questions arise are what hinder the stakeholders to play their parts in sustainable housing and to what extent do stakeholders aware of this concept and idea. This paper is trying to see where is the position of Malaysia in term of sustainable housing implementation and its awareness. The result will be used as a base to look further into Malaysia's situation, its implication and approach to be taken towards the stakeholders. It is a hope that this study will help to improve guideline for effective implementation of sustainable housing in Malaysia.

Keywords: Sustainable, Housing, Awareness, Implementation, Malaysia

1. Introduction

There is a common understanding that the housing and construction sector is one of the most important sectors with regards to a future sustainable development, as well as a central political concern as it has critical social, economic and environmental implications (Zainul Abidin, 2003). According to Edwards and Turrent (2000) housing, as against individual houses, is central to perceptions of quality of life; attractive homes in well managed estates are as education and job security to urban satisfaction. Therefore housing has great impact on the social interaction and from the economic perspective; it takes up a large proportion of the average families' budget and construction sector is a large economic sector that it affects the economic situation of the whole country. However evaluation of sustainable housing is far more complicated than that of economic–environmental problems, as it also includes the social dimension (Li and Shen, 2002). Furthermore, Edward and Turrent (2000) stressed that sustainable housing is constrained by consumer attitudes, not technical uncertainty.

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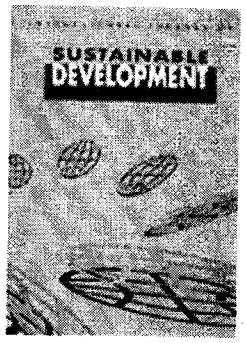
International Journal of Sustainable Development (9 papers in press)

Regular Issue

- **The policy-relevance of sustainability indicators reports: case study of the neutrality strategy of the CTSIP report**
  by Loraine Roy
  Abstract: This paper examines the policy-relevance of Sustainability Indicators Reports (SR), through the lens of a particular SR, Central Texas Sustainable Indicators Project Report (CTSIP). It especially focuses on SR authors' strategy to make their report policy-relevant when policy-makers are not their only targeted audiences. Theoretical and empirical results have been used, among them personal data collected from interviews



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resource sustainability

- **Incorporating sustainable management system into housing development practice in Malaysia**
  by Suzanne Khor, Abu Hassan Abu Bakar
  Abstract: A review of this sustainable management system in the housing development project acknowledges the sustainability management principles and the variables of sustainable housing development issues. The transition of a sustainable way in housing development is to ward off the constraints faced in the housing sector and to drive through the sustainable loop to undergo the evolution in new housing era. The primary objective is to achieve the balance of a sustainability triple bottom line at the end of the result. The suggestion made is to use a system tool to manage housing development in Malaysia in a sustainable approach.
  Keywords: *sustainability management system; urban planning mechanisms; sustainable housing variables; Malaysia.*

- **For an integrated and sustainable management of solid urban waste. An approach based on theory of social costs**
  by Alba Distaso
  Abstract: The focus of this paper is to critically evaluate if the phenomenon of solid urban waste, due to its complexity, pervasiveness and broad social involvement may be considered as a social cost rather than a pure negative externality. We intend to support our thesis through the theory of social costs elaborated by W. K. Kapp. We refer to some regions of Italy, especially to the regions of Campania and Apulia. In the former, waste has become an

SUSTAINABLE HOUSING PRACTICES IN HOUSING DEVELOPMENT TOWARDS ESTABLISHING SUSTAINABILITY INDEX

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ABSTRACT: This paper is presenting about sustainable housing development processes aimed with applying sustainability principles by drawing the experiences from exemplar projects in other countries The complexities of the projects do require compliances of project management best practices to achieve the goal of sustainable housing development. Identify the project critical success factor for application in the project management implementation in term of best practice to realize the goal of sustainable housing development. Sustainability Index is established with purpose to generated values for sustainable housing development into figures that used characterizes or evaluates specific aspects of the system thoroughly the assessment of housing sustainability indicators. The formula of sustainability index in housing development is established accordingly. The parameters or variables based on the identifiable indicators of the success factors is established with reference to the designed and practices of the green building rating system that had been adopted in Japan, United Stated, United Kingdom and other countries.

Keywords: **Project Management Best Practices, Sustainable Housing Development, Sustainability Index.**

1.0 Introduction:

The issue of sustainable housing is getting worldwide concern. The concept of sustainability is to meet the needs of today without compromising the needs of future generations has been evolved around for a number of years. (Brundtland Commission)[11] While sustainable housing defined unanimously to meet the criteria of producing good quality housing at a price that is affordable both in the short and long a term with creating elements of energy efficient, and healthy homes, while consider with respect to economic, environment and social benefits. (Frej, 2005) 'These objectives will by achieved by taking into account the existing running modes and demonstrating the real feasibility of sustainable housing principles to balance economics, environmental and social benefits, particularly for cooperatives and social housing organizations', cited in the exemplary cases of practicable SHE (Sustainable Housing in Europe) projects. The complication of construction projects do require the compliance of project management best practices to achieve goal of sustainable housing development with meet the projects critical criteria of finish in time, not over budget with built up the quality housing which is affordable, energy efficiency with taking regard to economic, environmental and social benefits. A life

[1] This definition is used by the U.S. Environmental Protection Agency. It is derived from an earlier, widely disseminated definition by the Brundtland Commission in its report *Our Common Future*

TOWARDS THE IMPLEMENTATION OF SUSTAINABLE HOUSING IN MALAYSIA : AWARENESS AND READINESS ASSESSMENT FRAMEWORK

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ABSTRACT : The concept of sustainability has become the keystone of the global dialogue about the human future in every facets of human life. However, it is still a difficult concept for many to fully understand; locally or globally. What exactly do we intend to sustain and what will that require of us? The questions arise are what hinder the stakeholders to play their parts in sustainable housing even though the concept has been introduced two decades ago, to what extent do stakeholders aware of this concept and idea, and how far they are ready to take serious parts to work cooperatively towards achieving the objectives as stipulated in Agenda 21 which the overall human settlement objective is to improve the social, economic and environmental quality of human settlements and the living and working environments of all people, in particular the urban and rural poor. This paper attempts to specifically clarify the concept of sustainable development and the relationship between sustainability and housing. It will also try to review existing papers and housing projects from different countries on the said subject. The review will be used as a base to look further into Malaysia's situation, its implication and approach to be taken towards the stakeholders. Subsequently, this study will help to improve guideline for effective implementation of sustainable housing in Malaysia.

Keywords : sustainable development, sustainable housing, sustainability awareness, awareness study, readiness study, housing in Malaysia

1.0 INTRODUCTION

Do we like the home in which we live today? Are we satisfied with the design of our neighbourhood, the level of noise, pollution, transport and availability of green space? Architect John Koh, the immediate past president of the Eastern Regional Organisation of Housing and Planning, and now FRAIA International Committee Member and the managing director of Arkitek Maju Bina Sdn. Bhd. believes that our homes, neighbourhood, the city and the environment we live in are simply not sustainable places. A sustainable building is a structure that is designed, built, renovated, operated or reused in a resource-efficient manner; in a way that will not compromise the health of the environment or the well-being of the building's occupants, construction workers, the general public or future generations. What we have now does not quite fit that statement. The ordinary Malaysian will tell you that he is confronted by so many unresolved sustainability issues. These ranges from non-availability of cheap and safe drinking water, increasing cost of energy and the lack of affordable homes to growing problems

ESTABLISHING CRITICAL SUCCESS FACTORS FOR PROJECT MANAGEMENT BEST PRACTICES IN SUSTAINABLE HOUSING IN MALAYSIA.

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Abstract

This paper is attempt to establish a theoretical framework for project management best practices in sustainable housing development. Effective management of projects is becoming increasingly important for sustainable housing to remain competitive in today's dynamic business environment. The objective of this paper is to establish success factors for project management best practices in the sustainable housing development in Malaysia. Review on past literature on the subject were carried out to build the existing research works on the area and to establish success factors of project management best practices. At the end of this paper, a new area of managing sustainable housing for future direction of this research was identified. A list of critical success factors for project management best practices for sustainable housing development in Malaysia was established.

Keywords: Sustainable Housing, Project Management, Best Practices, Critical Success Factors, Malaysia.

1.0 Introduction

Housing, as human beings' basic need, is a very important issue of people's everyday life. In 1948, 60 years ago, the United Nations, in its Universal Declaration of Human Rights, stated that "everyone has the right to a standard of living adequate for the health and well-being of himself and of his family including food, clothing, housing and medical care and necessary social services..." (United Nations, 1948, Article 25). Housing is an index of the standard of living of a people and it's described as a sine-qua-non of human living (Yakubu, 1980). Housing provision is one of the major challenges facing developing countries. Under the Seventh Malaysia Plan (1999-2000) and Eight Malaysia Plan (2001-2005), Malaysian governments are committed to provide adequate, affordable and quality housing for all Malaysian, particularly the low income group. This is in line with Istanbul Declaration on Human Settlement and Habitat Agenda (1996) to ensure adequate shelter for all.

Housing also is a key to sustainable development. In order to be sustainable, housing initiatives must be economically viable, socially acceptable, technically

PROJECT MANAGEMENT BEST PRACTICES FOR SUSTAINABLE HOUSING DEVELOPMENT

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ABSTRACT: This paper present the housing development processes aimed at applying sustainability principles by drawing the experiences from exemplar projects in other countries. The complexities of the projects do require compliances of project management best practices to achieve the goal of sustainable housing development. Firstly, identifying project management taxonomy with embraced eight identities project management knowledge areas based on the research efforts which performed by diverse industry practitioners. Through the analyses for patterns of behaviour based the observant of industry practitioners' performance, they synthesize a framework to help identify skills set to formulate best practices. This paper is to identify the project critical success factor for application in the project management implementation in term of best practice to realize the goal of sustainable housing development. In conjunction with the target goal, a guideline of the project management best practices methodology should incorporate into project working phases with practices Environment Management System (EMS) approach to realize the sustainable housing development vision. The parameters or variables based on the identifiable indicators of the success factors will refer to the designed and practices of the green building rating system that had been adopted in Japan, United Stated, United Kingdom and other countries.

Keywords: **Project Management Best Practices, Sustainable Housing Development, Project Lifecycle.**

1.0 Introduction:

The issue of sustainable housing is getting worldwide concern. The concept of sustainability is to meet the needs of today without compromising the needs of future generations has been evolved around for a number of years. (Brundtland Commission)[1] While sustainable housing defined unanimously to meet the criteria of producing good quality housing at a price that is affordable both in the short and long a term with creating elements of energy efficient, and healthy homes, while consider with respect to economic, environment and social benefits. (Frej, Anne B, 2005) 'These objectives will by achieved by taking into account the existing running modes and demonstrating the real feasibility of sustainable housing principles to balance economics, environmental and social benefits, particularly for cooperatives and social housing organizations', cited in the exemplary cases of practicable SHE (Sustainable Housing in Europe) projects. The complication of construction projects do require the compliance of project management best practices to achieve goal of sustainable housing development with meet the projects critical criteria of finish in time, not over budget with built up the quality housing which is affordable, energy efficiency with taking regard to economic, environmental and social benefits. A life cycle of housing projects procedure embraces the different stage of working phases. The defined crucial steps in working phases for a project life cycle of a construction projects are programming phases, design phase, building construction, building operation and building demolition in the final stage. Like mention above, the compliance of project management best practices. It is essential to practice for best practices methodology approaches while managing the project. The best practices methodology was suggested by author Simon Buehring (2005) with the approaches get authenticated as been practiced in past previous projects.

The working stages are defined based on the outline from author Kimberly, Gregor & Dale (2006). With incorporate each of the individual sustainable guidelines for each of the applicable life cycle areas that already practiced in country of North America, Europe, and Asia like Japan, Korea and Hong Kong, evaluate for each of the applicable life cycle areas of building with

PROJECT MANAGEMENT SUCCESS FACTORS FOR SUSTAINABLE HOUSING: A FRAMEWORK

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ABSTRACT

Housing is the critical issue in global urbanization which have a tremendous impact on the environment – both during construction and through out their. As the key element in urban development, housing plays a vital role in attaining the goal of sustainable development. Effective of project management is becoming increasingly important for sustainable housing to remain competitive in today's dynamic business environment. This paper attempt to establish a theoretical framework for project management success factors in sustainable housing development. Review on past literature on the subject were carried out to build the existing research works on the area and to establish critical success factors of project management best practices. At the end of this paper, a new area of managing sustainable housing for future direction of this research was identified. A list of critical success factors for project management practices for sustainable housing development was established.

Keywords: Sustainable Housing, Sustainable Development, Project Management, Critical Success Factors.

1.0 RESEARCH BACKGROUND

Housing, as human basic need, is a very important issue of people's everyday life. In 1948, the United Nations, in its Universal Declaration of Human Rights, stated that *"everyone has the right to a standard of living adequate for the health and well-being of himself and of his family including food, clothing, housing and medical care and necessary social services..."*. According to Winston (2007), housing is an essential aspect of life quality and it is also significant for sustainable development. As the key element in urban development, housing plays a vital role in attaining the goal of sustainable development. In order to be sustainable, housing initiatives must be economically viable, socially acceptable, technically feasible and environmentally compatible (Choguill, 2007). Housing encompasses the immediate environment, sanitation, drainage, recreational facilities, and all other economic and social activities that make life worthwhile (Olejado, 2003).

The World Commission on Environment and Development (WCED, 1987) report, Our Common Future has led to a world-wide notion of the concept of sustainable development (Meldon, 1998). Today there are over 300 published definitions of sustainable development, the products of diverse world views and competing vested interests (Moles and Kelly, 2000).

CRITICAL FACTORS FOR PROJECT MANAGEMENT BEST PRACTICES IN SUSTAINABLE HOUSING: A FRAMEWORK

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ABSTRACT

This paper attempt to establish a theoretical framework for project management success factors in sustainable housing development. Housing is the critical issue in global urbanization. As the key element in urban development, housing plays a vital role in attaining the goal of sustainable development. Effective management of projects is becoming increasingly important for sustainable housing to remain competitive in today's dynamic business environment. Review on past literature on the subject were carried out to build the existing research works on the area and to establish critical success factors of project management best practices. At the end of this paper, a new area of managing sustainable housing for future direction of this research was identified. A list of critical success factors for project management best practices for sustainable housing development was established.

Keywords: Sustainable Housing, Project Management, Best Practices, Critical Success Factors.

1.0 INTRODUCTION

Housing, as human basic need, is a very important issue of people's everyday life. In 1948, the United Nations, in its Universal Declaration of Human Rights, stated that *"everyone has the right to a standard of living adequate for the health and well-being of himself and of his family including food, clothing, housing and medical care and necessary social services..."* . Housing provision is one of the major challenges facing developing countries. Under the Seventh Malaysia Plan (1999-2000) and Eight Malaysia Plan (2001-2005), Malaysian governments are committed to provide adequate, affordable and quality housing for all Malaysian, particularly the low income group. This is in line with Istanbul Declaration on Human Settlement and Habitat Agenda (1996) to ensure adequate shelter for all.

Housing is the critical issue in global urbanization. As the key element in urban development, housing plays a vital role in attaining the goal of sustainable development. In order to be sustainable, housing initiatives must be economically viable, socially acceptable, technically feasible and environmentally compatible (Choguill, 2007). In the other hand, housing encompasses the immediate environment, sanitation, drainage, recreational facilities, and all other economic and social activities that make life worthwhile (Olejado, 2003).

Sustainable Housing Practice in Malaysia Housing Development towards Establishing Sustainability Index

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ABSTRACT
This paper present the housing development processes aimed at applying sustainability principles specific in Malaysia context by drawing the experiences from exemplar projects in other countries and comparing them with the development needs under local conditions. As housing sector development also a subcategory for urban development, so the development of the designated areas has to set a hypothetical boundary for evaluation according the definition in CASBEE for an urban area+ building. As well as LEED-ND do advocate the integration of smart growth, new urbanism, and green building practice in the neighborhood design. The housing sustainability index do measure the area development in sustainability criteria namely as environmental, society, economics, site/ land uses and facilities of communication and transportation and include the assessment particularly for residential building. It is possible to use two separate assessments tools simultaneously to assess development projects. The formula of sustainability index in housing development will be established accordingly to suit the context of our country. The parameters or variables based on the identifiable indicators of the success factors will be established with reference to the designed and practices in urban development contents and also green building rating system that been adopted in Japan, United Stated, United Kingdom and other countries.

Keywords: *Sustainable Housing Development, Urban Development, Building (Housing), Sustainability Index, Malaysia.*

1.0 Introduction

Nowadays, sustainable development is a common goal of many worldwide urban (re)development policies (Shutkin, 2000; Berke, 2002; Chan and Lee, 2006). The development of housing sector also include in the policies of urban development. There are many housing schemes have been developed in Malaysia since housing is prerequisite for human habitat settlements. Housing is also a major concern for all people in every corner of the world. In the present context, housing is developing in line with the goals of Habitat Agenda as well as the principles of Agenda 21 which is a blueprint for sustainable development in the 21st Century adopted by 179 nations including Malaysia in Rio de Janeiro in June 1992. (Tosics, 2004) stated that housing is one of the most important public policies affecting urban development and, as such, it has significant potential to contribute to sustainability. Various aspects of housing construction, design, use and demolition can have significant impacts on the environment. (Huby, 1998)

According to Islam (1996), the well accepted definition of sustainability was defined by the World Commission on Environment and Development. It is conceived as development "which meets the need of the present without compromising the ability of future generations to meet their needs" (WCED; 1987). This concept must recognize as a safe, secure and universally designed (A Sustainable Housing Forum Report, 2003).

Sustainable development is essential for human settlement development and gives full consideration to the needs of achieving economic growth, social development and environment protection. It is increasingly linked with the concept of quality of life, well being and livability (Moore and Scoott, 2005). It also a dynamic process in which communities participate and accommodate the needs of current and future generations in ways that reproduce and balance local social, economic, and ecological systems and link local action to global concern (Berke and Conroy, 2000). Being sustainable is as much about efficient profit-oriented practice and value for money as it is about helping the environment (BRE Report, 2002)

Sustainable development is unattainable without sustainable building and housing. Chougill (1994) stated that the sustainable housing may be understood in terms of ecological sustainability, economic sustainability, technological sustainability, cultural sustainability and social sustainability. According to Edwards and Turrent (2000) housing is sustainable if everyone has the opportunity of access to a home that is decent; if it promotes social cohesion, well-being and self-dependence.

The aim of this research is to develop a guideline for assessing the residential development in respect to sustainable housing concept for improving the level of sustainable practices in housing development. The formula of sustainability index in housing development will be developed based from the critical factors to the success of a sustainable building / housing and the rating system that apply in Japan, United Stated, United Kingdom and else available in others country.

Sustainable housing development should measure the area development within sustainability criteria namely as environmental, society, economics, site/ land uses and

Management of Residential Neighbourhood Development in Malaysia towards Sustainability

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Abstract: Housing surrounding is of vital importance for people livability. Housing development is instituted in the urbanization process. The sustainable measurement criteria for residential neighbourhood development are being adopted from the three sustainability rating systems namely, CASBEE-UD, LEED-ND and GBI-ST. The exploration research of the rating system criteria and factors that will unite to establish the theoretical framework for sustainable management methodology will be carried out. Basically, the focus of the rating system is mainly look into the planning and designing with the construction technically approaches. Even though the rating system is essential to be a guideline for achieving the sustainability objectives, but without the attendant of project management, the objectives might not able to be fulfilled. It can be perceived that project management are being overlooked in the system due to the role of project management is been identified as less related to technology and engineering in developing the rating systems. This study is to suggest that project management is playing the significant role for achieving project sustainability objectives. In further, the incorporation of sustainability concept into project management process in order to practise the sustainable way of management approach as can be seen as the evolution of sustainable rating system.

Keywords: Sustainable residential neighbourhood development; project management; sustainable management system; Malaysia.

1. Introduction

The population of Malaysia keeps increasing with the population is expected to be reached 28,250,500 and this will make the Malaysia in the rank of 44th the most populated country in the world (Population, 2010). In line with the growth of population, Malaysia like the other countries faced the pressure of the urbanization proses. According to the World Gazetteer (2010), the largest city and the first largest urban area is Kuala Lumpur, Johor Bharu is ranking the second largest city and also the second largest urban area in the country and Penang, the third largest city but was ranked the fifth largest urban area in Malaysia.

Based on the Malaysia demographic record, the population density positioning coincide with the statement of United Nations (2003), with stated more than half of the population live in the cities. It been proven that most of the population growth in the urban cities. Unfortunately, the housing scenario nowadays is in the edge of constrained development. Huby (1998) stated that the development of housing can give the significant impact on the environment. The imbalance among the element of environment, social and economy can give the impact of vicious cycle to the human life. Therefore, by gaining back the resilient of the housing neighbourhood development, it is the critical time to undergo the transformation of the housing development into the transition of sustainable development.

Adapted from Adler et.al.(2006), sustainable way of development can be considered as a way of enhancing the environment, that can contribute the benefits to human well-being, environmental health and life-cycle costs. In the new era of the world, sustainable development can be considered as a new trend of evolution. Many rating systems had been established in order to measure the sustainability level for the particular field by using their